IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellants: Glassen et al.

Group Art Unit: 2181

Serial No.: 09/539,024

Examiner: Justin King

Filed: 03/30/00

Appeal No.:

For: MEASURING UTILIZATION OF INDIVIDUAL COMPONENTS OF CHANNELS

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Date of Signature: October 03, 2003

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Brief of Appellants

Dear Sir:

This is an appeal from a final rejection, dated March 27, 2003, rejecting claims 1-54 of the above-identified application. This Brief is due within two months from the date the Notice of Appeal was received at the U.S. Patent and Trademark Office. Since appellants' postcard indicates the Notice of Appeal was received on July 3, 2003, this Brief was initially due by September 3, 2003. Thus, a Request For Extension Of Time and the requisite fee are enclosed herewith. Therefore, this Brief is being timely filed. The Brief is accompanied by a transmittal letter authorizing the charging of appellants' deposit account for payment of the requisite fee set forth in 37 C.F.R. §1.17(c).

Real Party In Interest

This application is assigned to International Business Machines Corporation by virtue of an assignment executed by the co-inventors, and recorded with the United States Patent and Trademark Office at reel 011124, frame 0320, on August 10, 2000. Therefore, the real party in interest is International Business Machines Corporation.

Related Appeals and Interferences

Appellants are not aware of a related appeal or interference that may directly affect or be directly affected by or have a bearing on the Board's decision in the instant appeal.

Status of Claims

This patent application was filed on March 30, 2000 with the U.S. Patent and Trademark Office. As filed, the application included 54 claims, of which 12 were independent claims (i.e., claims 1, 15, 20, 21, 33, 38, 39, 40, 41, 42, 50 and 54).

In an initial Office Action, dated September 4, 2002, claims 18 and 36 were objected to under 37 C.F.R. 1.75(c) as being of improper dependent form, and claims 1-54 were rejected under 35 U.S.C. 103(a) as being unpatentable over Galbraith et al. (U.S. Patent No. 5,265,240). A Response to Office Action was filed on January 6, 2003, in which claims 20, 38, 41 and 54 were amended.

On March 27, 2003, a final Office Action was issued. The improper dependent rejection was removed and the §103(a) rejection of claims 1-54 was replaced by a 35 U.S.C. 102(b) rejection. In particular, claims 1-54 were rejected under 35 U.S.C. 102(b) as being anticipated by Galbraith et al. Appellants filed a Response to the Final Office Action on June 2, 2003, in which no claims were amended.

Appellants received an Advisory Action dated June 24, 2003, which indicated that the request for consideration had been considered, but did not place the application in condition for allowance. A Notice of Appeal to the Board of Patent Appeals and Interferences was filed on July 1, 2003, accompanied by a one-month extension of time request, which were received on July 3, 2003.

The status of the claims is as follows:

Claims allowed – None;

Claims objected to – None;

Claims rejected – 1-54; and

Claims canceled – None.

Appellants are appealing the rejection of claims 1-54.

Status of Amendments

Appellants' remarks proffered in the Response to the final Office Action dated March 27, 2003 were considered. However, no claim amendment was effectuated by the Response. The claims as set out in the Appendix include all prior amendments.

Summary of the Invention

In one aspect, appellants' invention is directed to measuring the utilization of individual components of channels. That is, a channel has a plurality of individual components and each selected individual component is monitored and measured to determine the utilization of that particular component of the channel. This is advantageous because the modern channels, such as FICON channels, are able to multiplex many I/O operations at the same time and can pipeline the execution of channel programs, and thus, measuring the utilization of individual components of a channel facilitates planning for those channels. Further details regarding a channel that has a plurality of components are described below.

Referring to FIG. 4 of appellants' specification, as one example, channel 116 includes a plurality of components, such as, for instance, a channel processor 408, an internal PCI bus 406 from the processor to the adapter, and an adapter card 410 (e.g., a fibre channel adapter). The channel processor is responsible for interpreting the channel command words and moving data to and from host memory to channel memory 400. The PCI bus moves instructions and data from channel processor storage 400 to adapter 410. The fibre channel adapter moves instructions and data from the PCI bus to the external fabric attached control units 412. Depending on the type of channel programs executed

by the system, each of the three components of the channel may reach the limits of its capacity separately.

For example, small channel programs that include a few channel command words, but transfer a huge amount of data, have very little use of channel processor 408, but cause a very high utilization on internal PCI bus 406. However, a very long channel program that includes many channel command words, but only transfers very small amounts of data, requires very high utilization of the channel processor, but little use of the internal PCI bus and fibre channel adapter. Thus, no single number can adequately represent the channel utilization, since the components of the channel perform different tasks and can reach saturation at different points, depending on the nature of the I/O request for the applications using the channel. Further, many different applications can execute simultaneously on the channel, each with different characteristics and stressing different components of the channel at the same time. Therefore, in order for a customer to perform capacity planning and to correctly identify the resource of the channel that may be the bottleneck, each component of the channel is reported on separately. This allows the customer to identify the applications' I/O characteristics that can be added without saturating the channel, or that can be removed to avoid saturation.

In one particular aspect, appellants claim a method (e.g., claim 1), systems (e.g., claims 21 and 39) and a program storage device (e.g., claim 42) for determining utilization of channel components of a computing environment (e.g., page 6, lines 1-6; page 15, lines 7-15; and page 16, lines 13-17 of appellants' specification). A channel includes a plurality of components, and measurement data is obtained for a selected component of the plurality of components. That measurement data is then used to determine utilization of the selected component of the channel. Thus, in one aspect of appellants' claimed invention, the channel includes a plurality of components, and measurement data is provided for a selected one of those components. That measurement data is used to determine utilization of the selected component.

In another aspect of the present invention, measurement data for multiple components of the plurality of components is obtained, and the measurement data is used to determine utilization for each of the multiple components (e.g., claims 2, 22 and 43; and page 6, lines 1-6; page 15, line 7-15; and page 16, lines 13-17 of appellants' specification).

In yet another aspect of the present invention, operational characteristics of a selected component are obtained. These operational characteristics are used to determine utilization of the selected component. In one example, the selected component includes an internal channel bus, and the operational characteristics include a maximum number of bus cycles (e.g., claims 7 and 27; and page 18, lines 13-20 of appellant's specification). In a further embodiment, the selected component includes a channel processor, and the operational characteristics include a maximum number of channel work units (e.g., claims 8 and 28; and page 18, lines 13-22 of appellants' specification). In yet a further example, the selected component includes an external link of the channel, and the operational characteristics include at least one of a maximum number of written data units, a maximum number of read data units, and a size of the data units (e.g., claims 9 and 29; and page 18, lines 13-24 of appellants' specification).

In another aspect of the present invention, the obtaining of measurement data is performed using a channel path measurement facility executing in a first mode. Another channel path measurement facility is activated within the computing environment in a second mode (e.g., claim 14). The channel path measurement facility in the first mode and the channel path measurement facility in the second mode are concurrently active (see, e.g., page 18, lines 1-6 of appellants' specification).

In yet a further aspect of the present invention, appellants claim a method (e.g., claim 15), systems (e.g., claims 33 and 40) and a program storage device (e.g., claim 50) for obtaining information associated with channel components of a computing environment (e.g., page 16, lines 13-17 of appellants' specification). A channel within the computing environment to be monitored is selected and that channel includes a

plurality of components. Data is obtained for one or more components of the plurality of components. Thus, in this aspect of appellants' claimed invention, data is obtained for one or more individual components of a plurality of components of a channel.

In yet another aspect of the present invention, a method (e.g., claim 20), systems (e.g., claims 38 and 41) and a program storage device (e.g., claim 54) are provided for determining utilization of channels of a computing environment, in which the computing environment includes a plurality of logical partitions (e.g., FIG. 1, page 6, lines 6-12 of appellants' specification). Measurement data for a channel is obtained on behalf of a logical partition involved in determining utilization of a channel. The measurement data is representative of use of the channel by the logical partition and representative of use by one or more other logical partitions of the plurality of logical partitions. The measurement data is then used to determine utilization of the channel. Thus, in this aspect of appellants' claimed invention, the measurement data obtained for a particular logical partition is measurement data representative of a plurality of logical partitions (e.g., the logical partition involved in determining the utilization, as well as one or more other logical partitions).

In summary, appellants provide a channel measurement capability that enables the measurement of utilization of individual components of a channel, rather than just the channel as a whole. The measurement of individual components of the channel facilitates planning for those channels.

Issues

1. Whether claims 1-54 are anticipated by Galbraith et al. (U.S. Patent No. 5,265,240).

Grouping of Claims

There is one ground of rejection, and thus, one group of claims, Group I. Group I includes claims 1-54; however, the claims of Group I do not stand or fall together. Instead, each of the following subgroups of Group I includes claims that provide a separate basis of patentability.

Subgroup i: Claims 1, 3-6, 10-11, 13, 21, 23-26, 30-31, 39, 42, 44-48;
Subgroup ii: Claims 2, 22 and 43;
Subgroup iii: Claims 7 and 27;
Subgroup iv: Claims 8 and 28;
Subgroup v: Claims 9 and 29;
Subgroup vi: Claim 14;
Subgroup vii: Claims 15-19, 33-37, 40, 50-53; and
Subgroup viii: Claims 12, 20, 32, 38, 41, 49 and 54.

As understood, the claims of one subgroup do not stand or fall with any other subgroup of claims. Rather, each subgroup of claims is decided independently of the other subgroups of claims.

Argument

Group I, Subgroup i: Claims 1, 3-6, 10-11, 13, 21, 23-26, 30-31, 39, 42, 44-48

Claims 1, 3-6, 10-11, 13, 21, 23-26, 30-31, 39, 42 and 44-48 stand rejected under 35 U.S.C. 102(b) as being anticipated by Galbraith et al. (U.S. Patent No. 5,265,240). Appellants respectfully submit that the rejection of this subgroup is erroneous for the reasons herein.

Appellants' invention is directed, in one aspect, to measuring the utilization of individual components of channels. That is, a channel has a plurality of individual components, and each selected individual component is monitored and measured to determine the utilization of that particular component. This is advantageous because the modern channels, such as Ficon channels, are able to multiplex many I/O operations at the same time and can pipeline the execution of channel programs, and thus, measuring the utilization of individual components facilitates planning for those channels. Further details regarding a channel that has a plurality of components are described below.

Again, referring to FIG. 4 of appellants' specification, as one example, channel 116 includes a plurality of components, such as, for instance, a channel processor 408, an internal PCI bus 406 from the processor to the adapter, and an adapter card 410 (e.g., a fibre channel adapter). The channel processor is responsible for interpreting the channel command words and moving data to and from host memory to channel memory 400. The PCI bus moves instructions and data from channel processor storage 400 to adapter 410. The fibre channel adapter moves instructions and data from the PCI bus to the external fabric attached control units 412. Depending on the type of channel programs executed by the system, each of the three components of the channel may reach the limits of its capacity separately.

For example, small channel programs that include a few channel command words, but transfer a huge amount of data, will have very little use of channel processor 408, but will cause a very high utilization on internal PCI bus 406. However, a very long channel program that includes many channel command words, but only transfers very small amounts of data, require very high utilization of the channel processor, but little use of the internal PCI bus and fibre channel adapter. Thus, no single number can represent the channel utilization, since the components of the channel perform different tasks and can reach saturation at different points, depending on the nature of the I/O requests for the applications using the channel. Further, many different applications can execute simultaneously on the channel, each with different characteristics and stressing different

components of the channel at the same time. Therefore, in order for a customer to perform capacity planning and to correctly identify the resource of the channel that may be the bottleneck, each selected component of a channel is reported on separately. This allows the customer to identify the applications' I/O characteristics that can be added without saturating the channel, or that can be removed to avoid saturation.

In one example, appellants claim a method of determining utilization of channel components of a computing environment (e.g., independent claim 1). The method includes, for instance, obtaining measurement data for a selected component of a channel, the channel comprising a plurality of components; and using the measurement data to determine utilization of that selected component. Thus, in appellants' claimed invention, the channel includes a plurality of components, and measurement data is provided for a selected one of those components of the channel. That measurement data is used to determine utilization of the selected component. This is very different from the teachings of Galbraith.

In Galbraith, there is no discussion of measuring the utilization of individual components of a channel. Instead, a channel is considered as one entity. This is explicitly stated throughout Galbraith. For instance, in the abstract, it states, "Provides a method for measuring the busy utilization time for I/O channel used by any of plural operating systems (OSs) in a CEC." The utilization time is measured for the entire I/O channel. There is no discussion of measuring the individual components of a channel, as claimed by appellants.

In support of the rejection, the Office Action states:

> Galbraith's channel does include a plurality of components. Applicants' FIG. 1 shows the plurality of channel components (structure 116); Galbraith's FIG. 1, which is substantially similar to applicants' FIG. 1, also has the channel components.

Appellants respectfully disagree that structure 116 is a depiction of a plurality of channel components. Instead, each structure 116 is a channel in and of itself. Appellants are not

claiming in claim 1 a plurality of channels, but instead, a plurality of components of a channel. That is, appellants' claim is directed to the individual components of one channel. One example of the individual components of a channel are depicted in appellants' FIG. 4. There is no such corresponding illustration in Galbraith. Galbraith is not concerned with the components that make up a channel, but instead, is concerned with the channel as a whole. There is no teaching or suggestion in Galbraith of obtaining measurement data for a selected component of a channel that has a plurality of components, as claimed by appellants.

Moreover, even *assuming arguendo*, Galbraith's channel does have a plurality of components, there is no recognition in Galbraith of the individual components and there is no description, teaching or suggestion of obtaining measurement data for a selected component of a plurality of components of a channel. That is, regardless of whether a channel in Galbraith has various components, there is no description, teaching or suggestion in Galbraith of obtaining measurement data for a selected component of the various components. The channel in Galbraith is treated as one entity.

It is further stated in the Office Action:

> Galbraith's column 3, lines 54-56 states that each channel performs its own measurement; and the channels here means the channels within the I/O channel subsystem (as shown in Galbraith's figure 1, and further supported in column 3, lines 57-60), which is the components of the I/O channel subsystem, and the components of Applicants' claimed channel.

Appellants respectfully disagree with portions of the above statement.

While appellants agree that Galbraith's channels and appellants' channels are channels within an I/O channel subsystem, appellants are not claiming components of an I/O subsystem, but instead are claiming components of a channel within that I/O subsystem. Again, appellants are focused on the individual components of a channel. Appellants obtain measurement data for each of one or more of those individual channel components. Again, this is not described, taught, or suggested by Galbraith. Galbraith

merely mentions a channel and does not discuss the various individual components that make up a channel or of obtaining measurement data for the individual components of a channel. Therefore, Galbraith does not describe, teach or suggest appellants' claimed invention.

Since Galbraith is missing one or more features of appellants' claimed invention, appellants respectfully submit that the §102 rejection of independent claim 1, as well as the other independent claims (e.g., claims 21, 39 and 42), is erroneous.

Moreover, appellants respectfully submit that the claims dependent therefrom are also patentable for similar reasons, as well as for their own additional features.

Group I, Subgroup ii: Claims 2, 22, and 43

Claims 2, 22 and 43 stand rejected under 35 U.S.C. 102(b) as being anticipated by Galbraith et al. (U.S. Patent No. 5,265,240). Appellants respectfully submit that the claims of this subgroup have a separate basis of patentability from the claims of the other subgroups, and that the rejection of the claims of this subgroup is erroneous for the reasons herein.

As one example, claim 2 recites obtaining measurement data for multiple components of a plurality of components of a channel, wherein the measurement data is used to determine utilization for each of the multiple components. Thus, measurement data is obtained for individual components of a channel. Again, Galbraith fails to describe, teach or suggest measuring individual components of a channel. There is no description in Galbraith of taking measurements of multiple components of one channel, and using that measurement data to determine utilization for each of the multiple components of a channel.

Instead, Galbraith teaches obtaining a single utilization value for a channel, as described above. Galbraith disregards the individual components that make up a channel. There is no discussion of a desire to measure the individual components of a channel or

how such measurements would be taken. Galbraith simply treats the channel as a whole and is not concerned with the individual components of the channel.

Since Galbraith fails to describe, teach or suggest one or more features of appellants' claimed invention, appellants respectfully submit that the §102 rejection of dependent claim 2, as well as the other claims of this subgroup (e.g., claims 22 and 43), is erroneous.

Group I, Subgroup iii: Claims 7 and 27

Claims 7 and 27 stand rejected under 35 U.S.C. 102(b) as being anticipated by Galbraith et al. (U.S. Patent No. 5,265,240). Appellants respectfully submit that the claims of this subgroup have a separate basis of patentability from the claims of the other subgroups, and that the rejection of the claims of this subgroup is erroneous for the reasons herein.

As one example, claim 7 recites obtaining one or more operational characteristics of the selected component, wherein the selected component is an internal channel bus, and the one or more operational characteristics include a maximum number of bus cycles. Thus, in this aspect of appellants' claimed invention, the selected component for which measurement data is obtained and for which operational characteristics are obtained is specifically an internal bus of a channel. Further, the operational characteristics specifically include a maximum number of bus cycles.

There is no discussion, teaching or suggestion in Galbraith of an internal channel bus or of obtaining a maximum number of bus cycles of the internal channel bus. This is simply missing from Galbraith. Galbraith can ignore such features of appellants' claimed invention, since Galbraith is only concerned with the channel as a whole. Galbraith does not dissect the channel and does not describe the individual components of the channel nor the characteristics of such channels. Thus, Galbraith does not anticipate appellants' claimed invention.

Again, appellants respectfully submit that Galbraith does not disclose the measuring of individual components of a channel. Instead, the measuring is of the channel as a whole. Further, appellants respectfully submit that Galbraith ignores the individual components of the channel, and in particular, fails to describe, teach or suggest obtaining measurement data or operational characteristics of an internal bus of a channel and fails to even mention a maximum number of bus cycles.

Since Galbraith fails to describe, teach or suggest one or more aspects of appellants' claimed invention, appellants respectfully submit that the §102 rejection of the claims of this subgroup is erroneous.

Group I, Subgroup iv: Claims 8 and 28

Claims 8 and 28 stand rejected under 35 U.S.C. 102(b) as being anticipated by Galbraith et al. (U.S. Patent No. 5,265,240). Appellants respectfully submit that the claims of this subgroup have a separate basis of patentability from the claims of the other subgroups, and that the rejection of the claims of this subgroup is erroneous for the reasons herein.

As one example, claim 8 recites obtaining one or more operational characteristics of the selected component, wherein the selected component is a channel processor, and the one or more operational characteristics include a maximum number of channel work units. Thus, in this aspect of appellants' claimed invention, the selected component for which measurement data is obtained and for which operational characteristics are obtained is specifically a channel processor of a channel. Further, the operational characteristics specifically include a maximum number of channel work units.

While Galbraith mentions a channel processor, it specifically describes how the channel processor is responsible for determining the utilization of the channel; that is, the channel as a whole (see, e.g., col. 9, lines 58-66; col. 18, lines 1-2).

There is no discussion in Galbraith of obtaining measurement data for the channel processor itself. Further, there is no discussion of a maximum number of channel work units or of obtaining such a value. Again, Galbraith is not interested in the individual composition of the channel, nor of measuring each individual component, nor of determining the characteristics of the individual components. The channel in Galbraith is considered a single entity, and data is obtained for that entity as a whole.

Since Galbraith fails to describe, teach or suggest one or more aspects of appellants' claimed invention, appellants respectfully submit that the §102 rejection of the claims of this subgroup is erroneous.

Group I, Subgroup v: Claims 9 and 29

Claims 9 and 29 stand rejected under 35 U.S.C. 102(b) as being anticipated by Galbraith et al. (U.S. Patent No. 5,265,240). Appellants respectfully submit that the claims of this subgroup have a separate basis of patentability from the claims of the other subgroups, and that the rejection of the claims of this subgroup is erroneous for the reasons herein.

As one example, claim 9 recites obtaining one or more operational characteristics of the selected component, wherein the selected component is an external link of the channel, and the one or more operational characteristics include at least one of a maximum number of written data units, a maximum number of read data units, and a size of the data units. Thus, in this aspect of appellants' claimed invention, the selected component for which measurement data is obtained and for which operational characteristics are obtained is specifically an external link of a channel. Further, the operational characteristics specifically include a maximum number of written data units, a maximum number of read data units and/or a size of the data units.

There is no discussion, teaching or suggestion in Galbraith of an external link of the channel or of obtaining at least one of a maximum number of written data units, a maximum number of read data units, and a size of the data units of the external link of

the channel. This is simply missing from Galbraith. Galbraith can ignore such features of appellants' claimed invention, since Galbraith is only concerned with the channel as a whole. Galbraith does not dissect the channel and does not describe the individual components of the channel nor the characteristics of such channels. Thus, Galbraith does not anticipate appellants' claimed invention.

Since Galbraith fails to even mention, describe, teach or suggest one or more aspects of appellants' claimed invention, appellants respectfully submit that the §102 rejection of the claims of this subgroup is erroneous.

Group I, Subgroup vi: Claim 14

Claim 14 stands rejected under 35 U.S.C. 102(b) as being anticipated by Galbraith et al. (U.S. Patent No. 5,265,240). Appellants respectfully submit that the claim of this subgroup has a separate basis of patentability from the claims of the other subgroups, and that the rejection of the claim of this subgroup is erroneous for the reasons herein.

As one example, measurement data is obtained for a selected component of a channel having a plurality of components, and the obtaining of the measurement data is performed using a channel path measurement facility executing in a first mode. Another channel path measurement facility is activated within the computing environment in a second mode. The channel path measurement facility in the first mode and the channel path measurement facility in the second mode are concurrently active (see, e.g., page 18, lines 1-5).

There is no discussion, teaching or suggestion in Galbraith of a plurality of channel path measurement facilities. While Galbraith discusses a single channel path measurement facility (e.g., Col. 12, lines 4-68) that can perform various operations (Col. 13, lines 10-66), it does not discuss or suggest the concurrent activation of multiple channel path measurement facilities. This is missing from Galbraith.

Further, since Galbraith fails to teach or suggest concurrent activation of multiple channel path facilities, it follows that Galbraith fails to describe, teach or suggest that one facility is activated in one mode and the other facility is activated in another mode.

In support of the rejection, it is stated in the Office Action:

> In addition, Galbraith also discloses several different modes for the measuring instructions (Column 12, lines 8-21; Column 13, lines 14-66). Thus, Galbraith discloses a plurality of measurement instructions concurrently executing in different modes.

Appellants respectfully submit that they are not claiming different instruction modes of a single facility, but instead, are claiming a plurality of channel path measurement facilities. Galbraith fails to describe, teach or suggest such a plurality of channel path measurement facilities. Further, Galbraith makes no mention of one channel path measurement facility being active in one mode, while another channel path measurement facility is concurrently active in another mode.

Since Galbraith fails to teach or suggest one or more features of appellants' claimed invention, appellants respectfully submit that the §102 rejection of the claim of this subgroup is erroneous.

Group I, Subgroup vii: Claims 15-19, 33-37, 40, 50-53

Claims 15-19, 33-37, 40 and 50-53 stand rejected under 35 U.S.C. 102(b) as being anticipated by Galbraith et al. (U.S. Patent No. 5,265,240). Appellants respectfully submit that the claims of this subgroup have a separate basis of patentability from the claims of the other subgroups and that the rejection of the claims of this subgroup is erroneous for the reasons herein.

As one example, appellants claim a method of obtaining information associated with channel components of a computing environment (e.g., independent claim 15). A channel within the computing environment is selected to be monitored and that channel includes a plurality of components. Data is obtained on one or more components of the plurality of components. Again, data is obtained on particular components of a channel, instead of on the channel itself, as taught in Galbraith.

In Galbraith, there is no teaching or suggestion of obtaining data on the different components of a channel. Galbraith describes multiple channels, but does not describe multiple components of one channel. Further, Galbraith fails to teach or suggest the obtaining of data for those individual components.

Since Galbraith fails to break down a channel into its components and/or since Galbraith fails to describe, teach or suggest the obtaining of data on one or more of those components, the §102 rejection of claim 15, as well as independent claims 33, 40 and 50, is erroneous.

Moreover, the rejection of the claims dependent on those independent claims is erroneous for the same reasons presented herewith, as well as for their own additional features.

Group I, Subgroup viii: Claims 12, 20, 32, 38, 41, 49 and 54

Claims 12, 20, 32, 38, 41, 49 and 54 stand rejected under 35 U.S.C. 102(b) as being anticipated by Galbraith et al. (U.S. Patent No. 5,265,240). Appellants respectfully submit that the claims of this subgroup have a separate basis of patentability from the claims of the other subgroups, and that the rejection of the claims of this subgroup is erroneous for the reasons herein.

As one example, independent claim 20 recites a method of determining utilization of channels of a computing environment. The computing environment includes a plurality of logical partitions, and the method includes, for instance, obtaining on behalf

of a logical partition involved in determining utilization of a channel, measurement data for the channel. The measurement data is representative of use of the channel by the logical partition and representative of use by one or more other logical partitions of the plurality of logical partitions. The measurement data is then used to determine utilization of the channel. Thus, in appellants' claimed invention, the measurement data obtained for a particular logical partition is measurement data representative of a plurality of logical partitions (e.g., the logical partition involved in determining the utilization, as well as one or more other logical partitions). This is very different from the teachings of Galbraith.

Although Galbraith teaches a plurality of logical partitions, Galbraith does not teach or suggest that measurement data obtained for a particular logical partition is representative of multiple logical partitions. Instead, in Galbraith, the measurement data for each logical partition is exclusive for that logical partition. This is explicitly stated in Galbraith. For example, in Col. 2, lines 12-14, it is stated "The two OSs must be provided measurements which do not indicate the other OSs use of the shared I/O resources." Therefore, the measurements provided in Galbraith are for a single operating system (i.e., a single logical partition), and not for multiple logical partitions, as claimed by appellants. Thus, appellants respectfully submit that Galbraith does not anticipate appellants' claimed invention.

In support of the rejection, it is stated in the Office Action:

> Galbraith discloses a plurality of logical partitions (column 4, lines 15-16) and Galbraith also discloses that it is known to measure the utilization for each logical partition (column 2, lines 6-14).

Appellants respectfully submit that they are not simply claiming measuring the utilization for each logical partition, but instead, are explicitly claiming that the measurement data obtained for a particular logical partition is representative of use of the channel by multiple logical partitions. That is, the measurement data is representative of use of the

channel by the logical partition involved in determining utilization of the channel, as well as use by one or more other logical partitions. There is no description, teaching or suggestion in Galbraith that the measurement data being obtained for a particular logical partition represents a plurality of logical partitions. Instead, in Galbraith, each logical partition only obtains the information for that particular logical partition.

Since Galbraith fails to teach or suggest one or more features of appellants' claimed invention, appellants respectfully submit that the §102 rejection of the claims of this subgroup is erroneous.

Conclusion

Appellants respectfully request reversal of the §102(b) rejection of claims 1-54 set forth in the final Office Action. Appellants respectfully submit that their invention is not anticipated by Galbraith.

As one example, appellants respectfully submit that Galbraith fails to describe, teach or suggest obtaining data for individual components of a single channel. That is, Galbraith fails to break down a selected channel into its individual components, and then obtain data for one or more of those individual components of the channel. Instead, Galbraith treats a channel as a single entity.

For all of the above reasons, appellants allege error in rejecting their claims as anticipated by Galbraith. Accordingly, reversal of the §102 rejection is respectfully requested.

Respectfully submitted,

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Dated: October 03, 2003

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Appendix A

1. A method of determining utilization of channel components of a computing environment, said method comprising:

obtaining measurement data for a selected component of a channel, said channel comprising a plurality of components; and

using said measurement data to determine utilization of said selected component.

2. The method of claim 1, wherein said obtaining comprises obtaining measurement data for multiple components of said plurality of components, and wherein said using comprises using said measurement data to determine utilization for each of said multiple components.

3. The method of claim 1, further comprising obtaining one or more operational characteristics of said selected component.

4. The method of claim 3, wherein said using further comprises employing said one or more operational characteristics to determine said utilization of said selected component.

5. The method of claim 4, wherein said obtaining measurement data comprises obtaining said measurement data at a plurality of predefined intervals, and wherein said using comprises:

determining an average change in the measurement data over at least two intervals of said plurality of predefined intervals; and

dividing said average change by a value of at least one of said one or more operational characteristics.

6. The method of claim 5, wherein said value is a maximum value for that operational characteristic.

7. The method of claim 3, wherein said selected component comprises an internal channel bus, and said one or more operational characteristics of said internal bus comprise a maximum number of bus cycles.

8. The method of claim 3, wherein said selected component comprises a channel processor, and said one or more operational characteristics of said channel processor comprise a maximum number of channel work units.

9. The method of claim 3, wherein said selected component comprises an external link of said channel, and said one or more operational characteristics of said external link comprise at least one of a maximum number of written data units, a maximum number of read data units, and a size of said data units.

10. The method of claim 1, wherein said selected component comprises one of an internal bus of said channel, a channel processor and an external link of said channel.

11. The method of claim 1, wherein the channel is associated with a logical partition of said computing environment involved in the determining utilization, and wherein the measurement data comprises data representative of use of said selected component by said logical partition.

12. The method of claim 11, wherein the measurement data is further representative of use of said selected component by one or more other logical partitions of said computing environment.

13. The method of claim 1, wherein said obtaining measurement data is performed using a channel path measurement facility executing in a first mode.

14. The method of claim 13, wherein another channel path measurement facility is activated within said computing environment in a second mode, and wherein said channel path measurement facility in said first mode and said channel path measurement facility in said second mode are concurrently active.

15. A method of obtaining information associated with channel components of a computing environment, said method comprising:

selecting a channel within said computing environment to be monitored, said channel comprising a plurality of components; and

obtaining data on one or more components of said plurality of components.

16. The method of claim 15, wherein said obtaining data comprises obtaining one or more operational characteristics of said one or more components.

17. The method of claim 16, wherein at least one of said one or more operational characteristics comprises a maximal value of said operational characteristic.

18. The method of claim 15, wherein said obtaining data comprises obtaining measurement data usable in determining utilization of said one or more components.

19. The method of claim 15, wherein said obtaining data comprises:

obtaining one or more operational characteristics of said one or more components; and

obtaining measurement data for said one or more components, wherein said one or more operational characteristics and said measurement data are used to determine utilization of said one or more components.

20. A method of determining utilization of channels of a computing environment, said computing environment comprising a plurality of logical partitions, and said method comprising:

obtaining, on behalf of a logical partition involved in determining utilization of a channel, measurement data for the channel, said measurement data being representative of use of said channel by the logical partition and representative of use by one or more other logical partitions of said plurality of logical partitions; and

using said measurement data to determine utilization of the channel.

21. A system of determining utilization of channel components of a computing environment, said system comprising:

means for obtaining measurement data for a selected component of a channel, said channel comprising a plurality of components; and

means for using said measurement data to determine utilization of said selected component.

22. The system of claim 21, wherein said means for obtaining comprises means for obtaining measurement data for multiple components of said plurality of components, and wherein said means for using comprises means for using said measurement data to determine utilization for each of said multiple components.

23. The system of claim 21, further comprising means for obtaining one or more operational characteristics of said selected component.

24. The system of claim 23, wherein said means for using further comprises means for employing said one or more operational characteristics to determine said utilization of said selected component.

25. The system of claim 24, wherein said means for obtaining measurement data comprises means for obtaining said measurement data at a plurality of predefined intervals, and wherein said means for using comprises:

means for determining an average change in the measurement data over at least two intervals of said plurality of predefined intervals; and

means for dividing said average change by a value of at least one of said one or more operational characteristics.

26. The system of claim 25, wherein said value is a maximum value for that operational characteristic.

27. The system of claim 23, wherein said selected component comprises an internal channel bus, and said one or more operational characteristics of said internal bus comprise a maximum number of bus cycles.

28. The system of claim 23, wherein said selected component comprises a channel processor, and said one or more operational characteristics of said channel processor comprise a maximum number of channel work units.

29. The system of claim 23, wherein said selected component comprises an external link of said channel, and said one or more operational characteristics of said external link comprise at least one of a maximum number of written data units, a maximum number of read data units, and a size of said data units.

30. The system of claim 21, wherein said selected component comprises one of an internal bus of said channel, a channel processor and an external link of said channel.

31. The system of claim 21, wherein the channel is associated with a logical partition of said computing environment involved in the determining utilization, and wherein the measurement data comprises data representative of use of said selected component by said logical partition.

32. The system of claim 31, wherein the measurement data is further representative of use of said selected component by one or more other logical partitions of said computing environment.

33. A system of obtaining information associated with channel components of a computing environment, said system comprising:

means for selecting a channel within said computing environment to be monitored, said channel comprising a plurality of components; and

means for obtaining data on one or more components of said plurality of components.

34. The system of claim 33, wherein said means for obtaining data comprises means for obtaining one or more operational characteristics of said one or more components.

35. The system of claim 34, wherein at least one of said one or more operational characteristics comprises a maximal value of said operational characteristic.

36. The system of claim 33, wherein said means for obtaining data comprises means for obtaining measurement data usable in determining utilization of said one or more components.

37. The system of claim 33, wherein said means for obtaining data comprises:

means for obtaining one or more operational characteristics of said one or more components; and

means for obtaining measurement data for said one or more components, wherein said one or more operational characteristics and said measurement data are used to determine utilization of said one or more components.

38. A system of determining utilization of channels of a computing environment, said computing environment comprising a plurality of logical partitions, and said system comprising:

means for obtaining, on behalf of a logical partition involved in determining utilization of a channel, measurement data for the channel, said measurement data being representative of use of said channel by the logical partition and representative of use by one or more other logical partitions of said plurality of logical partitions; and

means for using said measurement data to determine utilization of the channel.

39. A system of determining utilization of channel components of a computing environment, said system comprising:

at least one processor adapted to obtain measurement data for a selected component of a channel, said channel comprising a plurality of components; and

at least one processor adapted to use said measurement data to determine utilization of said selected component.

40. A system of obtaining information associated with channel components of a computing environment, said system comprising:

a channel comprising a plurality of components; and

at least one processor adapted to obtain data on one or more components of said plurality of components.

41. A system of determining utilization of channels of a computing environment, said computing environment comprising a plurality of logical partitions, and said system comprising:

at least one processor adapted to obtain, on behalf of a logical partition involved in determining utilization of a channel, measurement data for the channel, said measurement data being representative of use of said channel by the logical partition and representative of use by one or more other logical partitions of said plurality of logical partitions; and

at least one processor adapted to use said measurement data to determine utilization of the channel.

42. At least one program storage device readable by a machine, tangibly embodying at least one program of instructions executable by the machine to perform a method of determining utilization of channel components of a computing environment, said method comprising:

obtaining measurement data for a selected component of a channel, said channel comprising a plurality of components; and

using said measurement data to determine utilization of said selected component.

43. The at least one program storage device of claim 42, wherein said obtaining comprises obtaining measurement data for multiple components of said plurality of components, and wherein said using comprises using said measurement data to determine utilization for each of said multiple components.

44. The at least one program storage device of claim 42, wherein said method further comprises obtaining one or more operational characteristics of said selected component.

45. The at least one program storage device of claim 44, wherein said using further comprises employing said one or more operational characteristics to determine said utilization of said selected component.

46. The at least one program storage device of claim 45, wherein said obtaining measurement data comprises obtaining said measurement data at a plurality of predefined intervals, and wherein said using comprises:

determining an average change in the measurement data over at least two intervals of said plurality of predefined intervals; and

dividing said average change by a value of at least one of said one or more operational characteristics.

47. The at least one program storage device of claim 42, wherein said selected component comprises one of an internal bus of said channel, a channel processor and an external link of said channel.

48. The at least one program storage device of claim 42, wherein the channel is associated with a logical partition of said computing environment involved in the determining utilization, and wherein the measurement data comprises data representative of use of said selected component by said logical partition.

49. The at least one program storage device of claim 48, wherein the measurement data is further representative of use of said selected component by one or more other logical partitions of said computing environment.

50. An article of manufacture, comprising:

at least one computer usable medium having computer readable program code means embodied therein for causing the obtaining of information associated with channel components of a computing environment, the computer readable program code means in the article of manufacture comprising:

computer readable program code means for causing a computer to select a channel within said computing environment to be monitored, said channel comprising a plurality of components; and

computer readable program code means for causing a computer to obtain data on one or more components of said plurality of components.

51. The article of manufacture of claim 50, wherein said computer readable program code means for causing a computer to obtain data comprises computer readable program code means for causing a computer to obtain one or more operational characteristics of said one or more components.

52. The article of manufacture of claim 50, wherein said computer readable program code means for causing a computer to obtain data comprises computer readable program code means for causing a computer to obtain measurement data usable in determining utilization of said one or more components.

53. The article of manufacture of claim 50, wherein said computer readable program code means for causing a computer to obtain data comprises:

computer readable program code means for causing a computer to obtain one or more operational characteristics of said one or more components; and

computer readable program code means for causing a computer to obtain measurement data for said one or more components, wherein said one or more operational characteristics and said measurement data are used to determine utilization of said one or more components.

54. At least one program storage device readable by a machine, tangibly embodying at least one program of instructions executable by the machine to perform a method of determining utilization of channels of a computing environment, said computing environment comprising a plurality of logical partitions, and said method comprising:

obtaining, on behalf of a logical partition involved in determining utilization of a channel, measurement data for the channel, said measurement data being representative of use of said channel by the logical partition and representative of use by one or more other logical partitions of said plurality of logical partitions; and

using said measurement data to determine utilization of the channel.